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A subjective comparison of unilateral photorefractive keratectomy vs. daily disposable soft contact lenses

Abstract

BACKGROUND: Daily disposable soft contact lenses have provided a new level of convenience for patients who are non-compliant or sensitive to preserved lens care regimens. Photorefractive Keratectomy (PRK) is becoming the surgery of choice for permanent refractive error correction. Subjects who underwent unilateral PRK were fitted with one day disposable contact lenses on the unoperated eye. The patients were surveyed pre-operatively to determine their past experience with contact lenses and their reasons for pursuing refractive surgery. The subjects were again surveyed six months post-operatively to compare the subjective response of the post surgical eye vs. the eye wearing the contact lens. Of particular interest was whether being aware of the option of a one day disposable lens would have influenced the subjects decision to pursue refractive surgery.

METHODS: Eighty-three subjects ranging in age from 21 to 61 years underwent unilateral PRK. The unoperated eye was fitted with a One Day Acuvue disposable lens. The subjects refractive errors ranged from -1.00 to -6.00 diopters with less than -0.75 diopters of refractive astigmatism.

RESULTS: Most respondents found the contact lens to be comfortable, yet 89% stated that they would still have pursued the refractive surgery even if they had been aware of the One Day Acuvue contact lens. The eye that underwent the PRK was found to be significantly more comfortable than the eye wearing the contact lens however, vision at night was significantly better with the eye_ wearing the contact lens. Vision during the day was better than vision at night through both modalities.

CONCLUSION: Most subjects found the daily disposable lens to be comfortable and easy to handle yet, they preferred the overall performance of the post surgical eye.

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**A SUBJECTIVE COMPARISON OF UNILATERAL
PHOTOREFRACTIVE KERATECTOMY VS. DAILY
DISPOSABLE SOFT CONTACT LENSES**

BY

SANDRA GROSS
AND
STACY HARRISON

A Thesis submitted to the faculty of the
College of Optometry
Pacific University
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for the degree of
Doctor of Optometry
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Sandra Gross, Stacy Harrison, Patrick J. Caroline FAAO

ABSTRACT

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RESULTS: Most respondents found the contact lens to be comfortable, yet 89% stated that they would still have pursued the refractive surgery even if they had been aware of the One Day Acuvue contact lens. The eye that underwent the PRK was found to be significantly more comfortable than the eye wearing the contact lens however, vision at night was significantly better with the eye wearing the contact lens. Vision during the day was better than vision at night through both modalities.

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INTRODUCTION

Photorefractive keratectomy (PRK) is quickly becoming a dependable and highly sought after procedure for the correction of myopia. Studies show that after one year, 96% of low myopes (1.00 - 6.00 D), 69% of moderate myopes (6.00 - 10.00 D) and 29% in the high myope category (greater than 10.00 D) achieved 20/40 or better visual acuity.¹ One drawback of the procedure is that glare can increase after surgery due to corneal haze making night vision more difficult.² One study showed that patients who underwent unilateral PRK cited symptoms of glare and halos as the main reasons for foregoing the procedure on the second eye.³ The most common long-term complication of PRK is progressive myopia. One study found that it occurred in 40.5% of -2.25 to -6.75 diopter myopes and in 83.3% of myopes in the -7.00 to -12.00 diopter range.⁴ Despite the complications associated with PRK, patient satisfaction is very high as long as individual expectations are realistic. A realistic goal of surgery is to reduce patients' dependency on corrective lenses. As much as patients may hope to obtain 20/20 vision, it is impossible to guarantee.

Daily disposable contact lenses are another modality of refractive error correction that is gaining in popularity. Almost all of the subjects in a recent study (98%) found the Acuvue daily disposable lens gave them good comfort and vision.⁵ The elimination of lens cleaning and disinfection increases the convenience to contact lens wearers. In the past, unsuccessful contact lens wearers were thought to be good candidates for PRK and successful contact lens wearers were considered poor candidates. According to a recent study, 75% of successful contact lens wearers indicated that they would consider refractive surgery in the future.⁶ Why do successful contact lens patients want to switch from their contact lenses to refractive surgery? And, would the comfort and convenience of daily disposable lenses influence the patients decision to pursue refractive surgery? These and other questions were addressed in our study. We surveyed patients who underwent unilateral PRK and were fitted with one day disposable contact lenses on the unoperated eye. A pre-surgical survey questioned the patients contact lens history as well as why they chose to pursue refractive surgery. A six month post surgical survey asked the patient how the PRK eye compared with the contact lens wearing eye in several key areas as well as their subjective opinion of the overall results.

PATIENTS AND METHODS

The patient sample consisted of 83 patients seen at the Refractive Surgery Center at the Casey Eye Institute which is part of the Oregon Health Sciences University in Portland, Oregon. Patients were required to meet certain inclusion criteria before being admitted into the investigation. An eligible patient was one who had a refractive error ranging from -1.00 to -6.00 D of myopia in one or both eyes, and refractive astigmatism of less than -0.75 D. The patient was required to have had a stable history of pre-treatment myopia including documented test and prescription history. For this purpose, stability of refractive correction for myopia was ± 1.0 D of change in spherical equivalent in the 12 month period preceding treatment. Contact lens wearers were required to refrain from wearing their hard contact lenses for at least three weeks (two weeks for soft lenses) prior to evaluation for final study inclusion and determination of refractive stability. Stable refraction for contact lens wearers was established at two consecutive examinations, three or four weeks apart, without wearing their lenses during the intervening period. A third examination, another two or three weeks later was used to determine stability if it was not evident by the second examination. Patients who did not meet this criteria by the third examination were discontinued from the study.

Patients were admitted into the study if the patient had a clear cornea in the area to receive laser energy. Additionally, the patient had to be free from major systemic and cardiovascular disease; and was willing and able to comply with the postoperative follow-up schedule. Eligible patients were required to give consent for random selection of the first treated eye unless their myopia exceeded -2.0 D in both eyes. The patient was required to be over 21 years of age of either sex or of any ethnic background. There was no upper age limit. Contact lens wearers were required to refrain from wearing their contact lenses at least three weeks prior to surgery for hard lenses and two weeks prior to surgery for soft contact lens wearers. The patient's treatment eye was required to have a stable history of pretreatment astigmatism of ± 0.75 D as determined by manifest refraction. For this purpose, stability of refractive correction for astigmatism was ± 0.75 D change in cylinder correction in the 12 month period preceding treatment.

Patients were excluded from participation in the study if the patient had either eye with less than 20/40 best corrected visual acuity. Patients were also excluded if they had any of the following conditions:

- collagen vascular diseases
- uncontrolled glaucoma
- uveitis
- uncontrolled blepharitis
- iritis
- severe dry eye
- keratoconus
- early keratoconus signs
- corneal epithelial, stromal or endothelial dystrophy
- pregnant or lactating
- previous ocular surgery
- previous corneal scarring
- irregular astigmatism

Patients were also excluded if they were currently on a topical or systemic steroid regimen or were participating in any other clinical trials for an ocular drug or treatment other than this treatment. Patients were required to meet all of the inclusion criteria and none of the exclusion criteria.

Prior to surgery, a survey was completed by each patient (Table 1). The objectives of the pre-surgical survey were to thoroughly assess the patient's past and present contact lens wearing experiences, to determine the patient's reasons for considering the abandonment of contact lenses for refractive corneal surgery, and to attempt to determine the etiology of the patients dissatisfaction with contact lenses, if any. For example, was the patients dissatisfaction with contact lenses fit related, a material related complication, an ongoing solution sensitivity or related to underlying eye disease i.e. dry eyes, GPC etc. For those patients who had never attempted contact lens correction, questions were asked pertaining to the reasons why.

The patients who met the criteria randomly underwent Photorefractive Keratectomy (PRK), on one eye only, with the Nidek EC-5000 excimer laser, for a cost of \$1500.00, which was assumed by the patient. The EC-5000 was limited during this study to the following functional parameter settings: (a) Treatment zone: 6 mm f. (b) Transition zone: 7.0 mm f. (c) Repetition rate: 4 scans/sec (equivalent to a laser pulse rate of 40 Hz, where each scan consists of 10 consecutive pulses placed sequentially across the diameter of the treatment or transition zone, followed by rotation of the beam slit orientation by 60° before the next scan). (d) Ablation rate: 0.48-0.72 mm/scan on the cornea, equivalent to an ablation rate on the test PMMA calibration plate of 0.2-0.3 mm/scan. The PMMA target ablation rate of 0.25 mm/scan should be set during calibration on the

PMMA test plate. Excimer laser fluence is automatically adjusted during the calibration process to reach this desired ablation rate range. Actual settings are recorded for each procedure.

The use of steroids has been reported to affect the healing processes of the eye following this type of procedure and could, therefore, be a confounding variable.⁷ For this reason, steroid use was not permitted during the first month following laser therapy under the protocol, except for the use of TobraDex prior to reepithelialization. At any time after the first month follow-up visit, patients were placed on topical steroid therapy only if they met one or more of the following criteria: (a) Corneal haze of "trace" or greater which interferes with BCVA to the extent of one or more lines of BCVA compared to pretreatment. (b) A combination of "1/2 trace" or "trace" haze, and myopia of 0.5 D or greater, below the intended target correction (regression). When indicated, the steroid regimen was limited to fluorometholone ophthalmic suspension, 0.25% (FML Forte) one drop q.i.d. for one month, at which time the patient was to be seen at follow-up. If the patient responded to the steroids with a decrease in haze and improvement in vision, and/or an improvement in their myopic regression, the dose was tapered one drop per month, going to t.i.d., then b.i.d., then once daily for a month at each dosing schedule. If the patient did not respond with either the decrease in haze and/or improvement in their myopia regression following the first month of steroid therapy, they were continued on steroids q.i.d. for an additional month up to a maximum of six (6) months postoperative, then tapered off using the above schedule. In each case where an Investigator determined that a patient met the criteria to institute steroid therapy, the Medical Monitor was notified in writing.

The standard post-operative care under the protocol for all patients was limited to the combination of tobramycin 0.3% with dexamethasone 0.1% (TobraDex) ointment q.i.d. for the immediate post-operative period throughout the first three (3) days or until the epithelium was healed. Diclofenac sodium, (Voltaren, 0.1%) was given to the treated eye for inflammation as one drop q2h following surgery (to a maximum of 4 doses on the treatment day-day 0), followed by q.i.d. on day 1, b.i.d. on day 2, and no treatment on day 3 or subsequent days. Bandaging of the eye beyond 24 hours was discouraged and was avoided. Ocular lubricants were given as needed. All post-operative medications were recorded. It was necessary for patients to wait a minimum of 6 months before considering surgery on the second eye. It was during this 6 month

period that contact lens correction was necessary, on the unoperated eye, to manage the anisometropia.

All the patients in the study were fitted with the One Day Acuvue Disposable lens on the unoperated eye. The One Day Acuvue lens was provided to the patient at no charge to rule out cost of the daily disposable lenses as an influence on the patients decision as to which modality provided them with the greatest overall success.

Patients enrolled in the study were evaluated preoperatively, on the day of the procedure, during day 1 - 5, and at 1, 3, 12, 18, and 24 months. Patients were requested to return annually thereafter. At the 6 month post-surgical examination, each patient was given a post-surgical contact lens survey to assess their subjective impressions of the two modalities of correction to compare the refractive surgery procedure with the mode of contact lens correction (Table 2). Their responses were evaluated by the Wilcoxon Signed Rank Test applied to various parameters obtained from the survey form including comfort, vision during the daylight, vision at night, and stability of vision in the morning vs. the evening. Convenience and handling of the daily disposable contact lens were also rated. The patients were also asked if they would have been less likely to pursue refractive surgery if their contact lenses were as they were now, and if they would be interested in continuing daily disposable contact lens wear for an additional 3 month period if charged the market price.

RESULTS

Demographic characteristics of the patient sample appear in Tables 3 and 4. Four percent of the all patients surveyed indicated they had never worn contact lenses. Thirty-three percent indicated they had worn contact lenses in the past, but are currently wearing glasses. Five percent presently wear contact lenses intermittently. Two percent wear contact lenses everyday for less than eight hours a day and 48% wear their contact lenses full time (8 to 16 hours a day). Four percent wear contact lenses on an extended wear/overnight basis and 3% did not respond (Table 5). Of the 4 patients who responded they had never worn contact lenses, when asked why they had never attempted contact lens correction, one indicated they lacked the motivation and were just not interested in wearing contact lenses. One patient indicated four reasons: they felt that the lens care would be too time consuming, they lacked the motivation and were not interested in wearing contact lenses, they were reluctant to wear contact lenses because they've heard that contact lenses can cause eye problems, and they wanted vision correction suitable for their

work environment which was dusty and hot. One patient was told that they have dry eyes and had allergies that may preclude any success with contact lenses, and one was told by their eye care professional that they were not a good candidate for contact lens correction.

When asked what type of contact lens was worn in the past or are currently being worn by the patients, 36% responded PMMA, 30% Rigid Gas Permeable, 43% soft lenses, 1% toric soft lenses, and 27% have worn or are currently wearing disposable contact lenses (Table 6). Of the hard or rigid gas permeable contact lens wearers 50% were using Boston Cleaner/Conditioner, 25% Boston Advanced Cleaner/Conditioner, 8% Barnes Hinds Comfort Care, 4% Lobob Cleaner and Wetting Solution, 4% Alcon Soaklens, 4% Allergan Wet-N-Soak, and 4% were using Allergan LC65 (Table 7). The soft contact lens care cleaning products being used by the patients who were wearing soft contact lenses were 50% Alcon Opti-free, 37% Bausch % Lomb Renu, 7% Allergan Complete, 3% Ciba AOSep, and 3% Ciba Quickcare (Table 8).

Contact lens complications such as, inconsistent or blurred vision, dryness, itching, burning, redness, mucus discharge, contact lens awareness, frequent lens damage, lid inflammation, photophobia, seasonal allergy related symptoms, foreign body sensation, protein build-up on contact lens, or non-specific decreased wear time, which were ranked by the patients, appear in Table 9. Only 30% of the patients consulted an eye care professional for any of these complications. Only 5 patients reported they had been diagnosed by their eye care professional as having a solution sensitivity, 3 were diagnosed as having giant papillary conjunctivitis (GPC), 2 with blepharitis, 1 with corneal edema, and 1 patient with a corneal ulcer. No one had ever been diagnosed with corneal neovascularization, corneal microcysts, exposure keratitis or meibomian gland dysfunction by their eye care professional (Table 10).

The desire to be less dependent on contact lenses was the most common reason affecting the patients' decisions for pursuing refractive corneal surgery with 72% of the patients listing this as their primary reason. Forty-one percent of the patients reported that contact lens discomfort was the reason for their decision to pursue refractive surgery. Contact lens vision unsatisfactory was indicated by 13% of the patients and contact lens and solution cost was indicated by 7% of the patient as the reason related to the patients' decisions for pursuing refractive corneal surgery (Table 11). When asked what the patients perceived to be the advantages of refractive surgery over contact lenses, the most common responses were freedom from

corrective devices, convenience, and comfort in environments not conducive to contact lens wear (ie. dusty, smoky, dry environments).

We performed a Wilcoxon Signed Rank Test and found that there was a significant statistical difference, ($P = <.0001$), between the comfort of the PRK eye verses the comfort of the One Day Acuvue Disposable Lens eye, with comfort of the PRK eye rated much higher on a scale of 0 to 5, 0 being poor and 5 being excellent. There was also a statistically significant difference, ($P = .0038$), between the vision of the One Day Acuvue Disposable Lens wearing eye at night and the vision of the PRK eye at night, with vision in the One day Acuvue Disposable Lens wearing eye rated much higher. Statistically significant differences were also found between the vision in the One Day Acuvue Disposable Lens wearing eye during the day verses during the night, ($P = <.0001$), with day being rated much higher, and between the vision of the PRK eye during the day verses during the night, ($P = <.0001$), with PRK day vision rated much higher. Although not statistically significant, ($P = .0794$), the vision in the eye with the contact lens during the day was rated higher by the patients than the vision in the eye with PRK during the day. No statistically significant difference was found between the rating of the stability of the PRK and the stability of the One Day Acuvue Disposable Lens, ($P = .5293$). The convenience and handling of the One Day Acuvue Disposable Lens was also rated by each patient and these appear in Table 12. Overall the convenience and handling were rated high.

Ten percent of the patients surveyed would have been less likely to pursue refractive surgery had they been aware of the One Day Acuvue Disposable Lens and 89% responded that they would still have continued with the PRK surgery had they known about the One Day Acuvue Disposable Lens. One percent of those patients surveyed did not respond (Table 13). Comfort and convenience of the lens were the main reasons as to why the patients would have been less likely to pursue refractive surgery had they been aware of the One Day Acuvue Disposable Lens. Of those patients who responded that they would still have continued with the PRK surgery had they known about the One Day Acuvue Disposable Lens, the most common reasons were again convenience and comfort and the ability to see without any corrective device, at anytime (eg. upon rising in the morning, while swimming, at work where the environment is not conducive to contact lenses). Thirty-one percent of the patients responded that they would be interested in continuing daily disposable contact lens wear for an additional 3 month period, if they were charged the market price for the lenses (ie. \$30.00 per month), and 51 percent responded that they would not (Table 14).

DISCUSSION

The results of the surveys indicated that while most subjects found the daily disposable contact lens to be comfortable and convenient, they still preferred the results of the PRK. Most subjects stated that the strongest motivating factor for them to obtain the surgery was the desire to be less dependent on corrective devices. They wanted to be able to function without a corrective device. The subjects preferring the PRK over the One Day Acuvues made the following comments:

- I like being able to see without contact lenses.
- Any contact lens would impact my outdoor activities.
- I wanted to be able to get up in the morning and see without correction.
- Contacts are too expensive.
- I have difficulty inserting and removing the lenses
- I develop pain from contacts.
- I am satisfied with the contact lenses but would still have the surgery.
- I do not want the inconvenience of dealing with contact lenses.
- I can't wear contacts at work because of a dusty environment.
- Contacts are a bother.
- I wanted eye surgery to avoid wearing any contact lenses.
- The contact lens program was very good.
- No more expenses for contacts or glasses.
- No more irritants under contacts.
- Vision is great without any aid now.
- I wanted the permanent stability of the laser surgery.
- I wanted to be free from contact lens hassle.
- I still have discomfort and lack of clarity through the contact lens.
- I wanted to get rid of all corrective devices through the surgery.
- Too much irritation!
- The contact lenses were really nice but I wanted to see the clock in the morning.
- I wanted to see my children while swimming.
- I am beginning to suspect that the cumulative damage from years of contact lens wear is easily as traumatic to the cornea as is this surgery.
- Because I did not want to be dependent on contacts on trips, water sports and when my eyes are tired.
- I want to see 24 hours a day, not just when it's convenient to wear contacts.
- I want to see without contacts when I get up in the morning.

- Being able to see when first awakening is better.
- Dust and wind sometimes causes my eyes to water while wearing contact lenses.
- I can see well enough to get around with the operated eye. This is care free.
- I am very satisfied with the comfort, my vision and the overall surgery.
- I don't want to deal with contact lenses.
- I have astigmatism so vision with the Acuvue is not as good as with hard lenses.
- I already wore disposables.
- I definitely prefer not having to be dependent on any corrective devices.
- I wanted to get away from having anything in my eye because there were times that contact lenses caused inconvenience due to prolonged wearing time.
- I didn't want to be dependent on contact lenses.
- I don't like contacts even the soft lenses are uncomfortable with dry eyes.
- Disposable lenses are a big improvement but they sometimes flip out when my eyes are dry and they are sometimes difficult to insert even with six months practice.
- I would still have to deal with dry eyes, dust etc.
- The objective is to have corrected vision without assistance.
- Wearing the daily disposable contact lenses was a problem due to occasional pain, dryness and sports problems.
- There is still an inconvenience with wearing contact lenses, I have to keep using re-wetting solutions.
- I wanted sight without glasses.
- My eyes are too dry to contemplate long term contact lens wear.
- Contacts don't help at night if you have to get up or in the morning. I also worry about emergencies, that is being caught without them.
- The contacts were a minor hassle but still a hassle.
- I am pleased to be able to see without having to be messing with putting contacts in and maintaining the lenses with cleaning and care. It is nice to wake in the middle of the night and be able to see.
- Contacts are contacts.
- The idea of never having to wear glasses again for someone who has almost always had to wear them is an attractive lure and now due to this study it is an attainable goal.

- Contacts are uncomfortable for me no matter what the type. By the end of the day I can not wait to take the lenses out although the One Day Acuvues have been the most comfortable and convenient of all the lenses I have worn.
- I kept losing my contacts.
- I am tired of wearing contacts.
- I have really enjoyed the comfort of the soft daily disposable contact lenses and the convenience they offer over my former gas permeable hard lenses. I have not been able to see a clear 20/20 and I would like that best, especially for driving.
- I am heavily into outdoor and water sports and any prosthetic device can be problematic.
- I was not able to tolerate use of these lenses for more than four hours/day. As my vision has improved in my operated eye, it has been easier and more comfortable to not use the right contact lens.
- Extended wear lenses are less trouble than the daily disposable.
- The lenses are somewhat convenient but the refractive surgery is practically miraculous.

Those subjects who stated that they would have been less likely to pursue the PRK had they known about One Day Acuvues made the following comments:

- I was aware that I would become far-sighted in my operated eye. However, I did not realize how annoying that would be.
- I did not realize how disruptive and painful the operated eye would be post-surgery.
- For now, I have decided not to have the other eye operated on as I don't want to give up my excellent short-range vision. I have never been able to wear any type of contacts before and the One Day Acuvues were so comfortable that I was amazed. I really didn't think they were an option for me so if I had known they were, I may have just gone with them instead of the surgery.
- I like the soft disposable lenses however, the vision isn't as clear or as sharp as with a hard lens.
- They are very convenient and easy to put in and very comfortable.
- I still would have done the surgery, but the comfort of the new lenses might have kept me from ever seeking an alternative.
- The disposable lenses were much more comfortable and longer wearing than my gas perms but, often I had great difficulty inserting them "right side up". you need to develop some kind of indicator so wearers can tell right side out before insertion.

- The Acuvue One Day lens is much more convenient than the ones I used before. I wish I would have used these long ago!

Interestingly enough, in the subjects comments, no one mentioned that their vision was better out of the post surgical eye as a reason for preferring the surgery. Most people were happy to get their vision improved enough so that they could "see the clock in the morning". It seems that most subjects are willing to go through the post operative pain and fluctuating vision after PRK surgery if it means not being dependent on corrective devices. It should be noted that the subjects who participated in this study were not a random sampling of the population, rather they were people who had already made up their minds to pursue refractive surgery.

When questioned about whether they would continue with the Acuvues for three months if charged the market price for lenses, 62% said they wanted to go ahead immediately with the surgery to the second eye. More interesting is that 37% said they would wait another three months. This seems to conflict with the 10% who said they would have been less likely to pursue the surgery had they known about the Acuvues. Why wait if they were satisfied with the results of the first surgery? Cost could be a factor since they would have to pay \$1,500.00 for the surgery to the second eye as opposed to approximately \$90.00 for three months worth of Acuvues.

Since the most frequent reasons for choosing PRK over contact lenses had to do with dependence on corrective devices, the Acuvues are not a viable alternative to the PRK. However, for the instances where contact lens convenience, comfort and solution costs are the issue, daily disposable lenses provide a less radical alternative to refractive surgery. Even though PRK is a relatively safe procedure, there are always risks involved with any type of surgery. According to Pacific Cataract and Laser Institute in Chehalis, Washington, some risks associated with PRK include:

- delayed epithelial healing
- infection
- corneal perforation
- light sensitivity
- temporary overcorrection
- undercorrection
- contact lens intolerance\microscopic irregularities
- corneal haze
- regression
- glare or halos
- decentration
- problems with eye coordination

- presbyopia
- raised eye pressure⁸

The difference in vision at night between the eye wearing the contact lens and the post surgical eye was significant. Subjects reported better vision with the eye wearing the lens. This is most likely attributed to the increase in glare experienced by many PRK patients. Glare is caused by the light scattering through haze in the cornea. The greater the contrast between the point source of light and the background, the more noticeable this phenomenon is. Halos are an optical effect that may be noticed in dim light situations when the pupil dilates larger than the area of correction. According to the Pacific Cataract and Laser Institute, approximately 50% of people who have had laser correction experience glare or see halos with bright lights at night. These effects are most apparent right after surgery and tend to diminish during the following months.⁹

A significant number of subject preferred the comfort of the PRK eye to that of the eye wearing the contact lens. At the time of this study, the One Day Acuvue was only available in one base curve. This may have contributed to some of the dissatisfaction with the comfort and vision of the eye wearing the contact lens. Also, some subjects reported difficulty in handling the lens even after six months.

Most subject rated the handling and comfort of the One Day Acuvue lens very highly. Most of the subjective comments seemed to support this. This study indicates that patients who are considering refractive surgery should be made aware of the availability of the One Day Acuvue disposable lens and possibly try them out for a six month period prior to deciding whether to go ahead with refractive surgery.

Further research on the same subjects is being done in another study to compare more objective measurements of the performance of the two modalities, this study focused on subjective motivation and why one modality was preferred over the other. The main reason the PRK was preferred was that although the Acuvue daily disposable lens was found to be very comfortable, it still involved some effort on the part of the patient and most patients did not want any effort to be involved with their clear vision.

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Table 1
Pre-Surgical Contact Lens Survey

Name_____Age_____Date_____

The following survey is designed to assess your history of contact lenses for the correction of your nearsightedness. Please take a moment to answer the following questions:

My current status with contact lenses is best described as:
(please select only one)

- I have never worn contact lenses. (please proceed directly to the last page)
- I have worn contact lenses in the past, but I currently wear glasses full time.
- I presently wear contact lenses intermittently. (only on occasion)
- I wear contact lenses everyday, but my wearing time is limited to under 8 hours a day.
- I wear my contact lenses full time. (8 to 16 hours a day)
- I wear my contact lenses on an extended wear (overnight) schedule.

If you have, in the past, or are currently wearing contact lenses, please fill in the following:

(select as many as applicable)

- Hard lenses for_____years/months.
- Rigid Gas Permeable lenses for_____years/months.
- Soft lenses for_____years/months.
- Toric soft lenses for_____years/months.
- Disposable soft lenses for_____years/months.

If you are currently wearing **hard or gas permeable** contact lenses, what lens care cleaning product are you using:

- Boston Cleaner/Conditioner
- Alcon Soaklens
- Allergan Wet-N-Soak
- Barnes Hinds Comfort Care
- Boston Advanced Cleaner/Conditioner
- Alcon Opti-Soak
- Sherman D Stat
- Lobob Cleaner and wetting solution
- Other, please specify_____

If you are currently wearing **soft** contact lenses, what lens care cleaning product are you using:

- Alcon Opti-free
- Allergan complete
- Allergan Oxysept
- Ciba AOSept
- Alcon Opti-one
- Allergan Ultracare
- Bausch & Lomb Renu

- Ciba Quickcare
- Heat disinfection
- Other, please specify_____

Has your eye care professional ever diagnosed you with any of the following:

- Blepharitis
- Giant Papillary Conjunctivitis
- Corneal neovascularization
- Corneal microcysts
- Exposure keratitis
- Solution sensitivity
- Corneal ulcer
- Corneal edema
- Meibomian gland dysfunction

Is your decision to pursue refractive corneal surgery related to:
(select as many as applicable)

- Contact lens discomfort
- Contact lens vision unsatisfactory
- Contact lens and solution cost
- Desire to be less dependent on contact lenses

What do you perceive to be the advantages of refractive surgery over contact lenses?_____

I have never attempted contact lens correction due to:
(select as many as possible)

- I have a fear of placing lenses on my eyes.
- I feel that the lens care will be too time consuming for me.
- I lack the motivation, or am just not interested in wearing contact lenses.
- I am reluctant to wear contact lenses because I've heard that they can cause eye problems.
- I have been told I have dry eyes.
- I have allergies which may preclude any success with contact lenses.
- I have been told I have too much astigmatism.
- My correction is too low for correction with contact lenses.
- My correction is too high for correction with contact lenses.
- I need a distance and near correction.
- I have been told by my eye care professional that I am not a good candidate for contact lenses.
- Contact lenses and care solutions are too expensive for my budget.
- Other, please explain:_____

Table 2
6 month Post-Surgical Contact Lens Survey

Name _____ Age _____ Date _____

How would you grade the physical comfort of your operated eye

(please circle one)

0 1 2 3 4 5
 Poor Excellent

How would you grade the physical comfort of your contact lens wearing eye

(please circle one)

0 1 2 3 4 5
 Poor Excellent

How would you grade the vision of your operated eye

(please circle one in each category)

In the daylight

0 1 2 3 4 5
 Poor Excellent

At night time

0 1 2 3 4 5
 Poor Excellent

How would you grade the stability of your vision in the morning vs. the evening
 (does your vision fluctuate?) of your contact lens wearing eye.

(Please circle one)

0 1 2 3 4 5
 Poor Excellent

How would you rate the convenience of the daily disposable contact lens?

(Please circle one)

0 1 2 3 4 5
 Poor Excellent

How would you rate the handling of the daily disposable contact lens?

(Please circle one)

0 1 2 3 4 5
 Poor Excellent

Would you have been less likely to pursue refractive surgery if you had been
 aware of the Acuvue One-Day contact lens?

Yes No

Explain: _____

Table 3

Gender Distribution of the Patient Sample

| | Number | (%) |
|--------|--------|-------|
| Male | 39 | (47) |
| Female | 44 | (53) |
| Total | 83 | (100) |

Table 4

Age distribution of the Patient Sample

| | Number | (%) |
|--------------------|--------|-------|
| 21 to 29 years old | 10 | (12) |
| 30 to 39 years old | 20 | (24) |
| 40 to 49 years old | 39 | (47) |
| 50 to 59 years old | 13 | (16) |
| Over 59 years old | 1 | (1) |
| Total | 83 | (100) |

Table 5

Current Contact Lens Status of the Patient Sample

| | Number | (%) |
|--|--------|-------|
| Have never worn contact lenses | 4 | (5) |
| Have worn contact lenses in past, currently wear glasses | 28 | (34) |
| Presently wear contact lenses intermittently | 4 | (5) |
| Wear contact lenses everyday, wearing time is < 8 hours | 2 | (2) |
| Wear contact lenses full time (8 to 16 hours a day) | 40 | (48) |
| Wear contact lenses on an extended wear/overnight basis | 3 | (4) |
| No response | 2 | (2) |
| Total | 83 | (100) |

Table 6

Type and Duration of Contact Lenses Worn in the Past and Currently By the Patient

| | < 1 year | 1-5 yrs. | 5-20 yrs | > 20 yrs | Number | (%) |
|---------------------|----------|----------|----------|----------|--------|------|
| PMMA | 1 | 9 | 13 | 7 | 30 | (36) |
| Rigid Gas Permeable | 3 | 10 | 12 | 0 | 25 | (30) |
| Soft Lenses | 7 | 5 | 20 | 4 | 36 | (43) |
| Toric Soft Lenses | 1 | 0 | 0 | 0 | 1 | (1) |
| Disposable | 6 | 14 | 2 | 0 | 22 | (27) |

Table 7

Lens Care Cleaning Products Being Used by Current Hard or Rigid Gas Permeable Contact Lens Wearers

| | Number | (%) |
|-------------------------------------|--------|------|
| Boston Cleaner/Conditioner | 12 | (50) |
| Boston Advanced Cleaner/Conditioner | 6 | (25) |
| Barnes Hinds Comfort Care | 2 | (8) |
| Lobob Cleaner and Wetting Solution | 1 | (4) |
| Alcon Soaklens | 1 | (4) |
| Allergan Wet-N-Soak | 1 | (4) |
| Other | 1 | (4) |
| Alcon Opti-Soak | 0 | (0) |
| Sherman D Stat | 0 | (0) |

Table 8

Lens Care Cleaning Products Being Used by Current Soft Contact Lens Wearers

| | Number | (%) |
|--------------------|--------|------|
| Alcon Opti-free | 15 | (50) |
| Bausch & Lomb Renu | 11 | (37) |
| Allergan Complete | 2 | (7) |
| Ciba AOSept | 1 | (3) |
| Ciba Quickcare | 1 | (3) |
| Allergan Ultracare | 0 | (0) |
| Allergan Oxysept | 0 | (0) |
| Alcon Opti-one | 0 | (0) |
| Heat disinfection | 0 | (0) |
| Other | 0 | (0) |

Table 9

Contact Lens Manifestations and their Ranking by the Contact Lens Patients
(0 being none to 5 being extreme)

| | 0 | 1 | 2 | 3 | 4 | 5 |
|---|----|----|----|---|---|---|
| Inconsistent or Blurred Vision | 24 | 11 | 9 | 6 | 3 | 0 |
| Dryness | 9 | 12 | 17 | 9 | 6 | 1 |
| Itching | 22 | 19 | 5 | 3 | 5 | 0 |
| Burning | 19 | 18 | 8 | 7 | 1 | 0 |
| Photophobia (light sensitivity) | 21 | 15 | 11 | 2 | 4 | 1 |
| Seasonal Allergy Related Symptoms | 30 | 9 | 5 | 5 | 4 | 1 |
| Non-specific Decreased Wear Time | 27 | 14 | 3 | 6 | 3 | 0 |
| Redness | 18 | 11 | 12 | 3 | 6 | 3 |
| Mucus Discharge | 38 | 6 | 3 | 4 | 3 | 0 |
| Contact Lens Awareness (too tight | 27 | 15 | 5 | 3 | 3 | 1 |
| Frequent Lens Damage (breakage/tearing) | 40 | 10 | 2 | 0 | 2 | 0 |
| Foreign Body Sensation | 19 | 19 | 3 | 4 | 7 | 1 |
| Protein Build-up on Contact Lens | 19 | 12 | 10 | 6 | 8 | 0 |
| Lid Inflammation | 42 | 4 | 4 | 2 | 1 | 0 |

Table 10

Previous Conditions Diagnosed by the Patients' Eye Care Professional

| | Number | (%) |
|--------------------------------------|--------|-----|
| Solution Sensitivity | 5 | (6) |
| Giant Papillary Conjunctivitis (GPC) | 3 | (4) |
| Blepharitis | 2 | (2) |
| Corneal Edema | 1 | (1) |
| Corneal Ulcer | 1 | (1) |
| Corneal Neovascularization | 0 | (0) |
| Corneal Microcysts | 0 | (0) |
| Exposure Keratitis | 0 | (0) |
| Meibomian Gland Dysfunction | 0 | (0) |

Table 11

Reasons Related to the Patients' Decisions for Pursuing Refractive Corneal Surgery

| | Number | (%) |
|---|--------|------|
| Desire to be less Dependent on Contact Lenses | 60 | (72) |
| Contact Lens Discomfort | 34 | (41) |
| Contact Lens Vision Unsatisfactory | 11 | (13) |
| Contact Lens and Solution Cost | 6 | (7) |

Table 12

Rating of the Convenience and Handling of the One Day Acuvue Disposable Lens
(0 being Poor to 5 being Excellent)

| | 0 | 1 | 2 | 3 | 4 | 5 |
|-------------|---|---|---|----|----|----|
| Convenience | 0 | 4 | 2 | 9 | 26 | 38 |
| Handling | 0 | 7 | 3 | 13 | 24 | 32 |

Table 13

Patients' Response to the Question: "Would you have been less likely to pursue refractive surgery had you been aware of the One Day Acuvue Disposable Lens?"

| | Number | (%) |
|-------------|--------|------|
| No | 74 | (89) |
| Yes | 8 | (10) |
| No Response | 1 | (1) |

Table 14

Patients' Response to the Question: "Would you be interested in continuing daily disposable contact lens wear for an additional 3 month period if you were charged the market price for the lenses? (ie \$30.00 per month)"

| | Number | (%) |
|-------------|--------|------|
| No | 51 | (62) |
| Yes | 31 | (37) |
| No Response | 1 | (1) |